Remarks

1. The Examiner has rejected claims 1, 9, 12 and 18 to 20 under 35 U.S.C. §102 as being anticipated by Baines (US6421334). Applicants note for the record that the present application and the prior art reference Baines are under the common ownership of Nortel Networks Limited.

2. Referring to claim 1, it is the Examiner's position that Baines teaches all the limitations of this claim. Consequently, the applicants submit herewith revised claim 1 amended in a manner believed to patentably distinguish the method of the present invention as defined by revised claim 1 over the disclosure of Baines.

3. The method of the present invention as defined by claim 1 includes the limitations that "*for each subscriber terminal signal received, determining a best signal component; wherein for each determination of a best signal component, the method includes the steps of: determining a difference in time between reception of said best signal component and a reference time; and transmitting to said terminal a transmission timing offset in order to receive said best signal component at substantially said reference time*" (emphasis added). Thus, the method as now claimed requires that each time the base station determines a best signal component from the multipath components comprising a received signal from a subscriber terminal, it determines a time difference between the newly determined best signal component and a reference time and then transmits a timing offset to said terminal to cause said terminal to adjusts its transmission timing such that the newly determined best signal component is received at the base station substantially in line with the reference time. The base station performs this process with every terminal. It also performs this process every time it determines for each terminal a new best signal component for that terminal. In a highly mobile environment where the multipath components comprising a received terminal signal may not only fade/grow in magnitude but vary rapidly in time relative to each other and even more rapidly

disappear/reappear, it is not desirable to use the technique as particularly disclosed by Baines as will be more fully explained below. In the present invention, by determining a time difference between a newly determined best signal component and a reference time and transmitting to the terminal a timing offset related to the newly determined time difference, the terminal can be controlled to rapidly shift its timing for the newly determined best signal component to generally align it with the reference time. In a highly mobile environment where changes in the composition and characteristics of the multipath components occur rapidly and where said components may even disappear/reappear just as suddenly, it is necessary to be able to rapidly shift the transmission timing of a terminal by a large amount, relatively speaking, and to do so on current data rather than on relatively old data. This is not an issue in a fixed or low mobility environment. In the case of slewing, for example, where a continuous series of small changes are instructed, the base station may not have sufficient time to send sufficient numbers of small change commands to cause the terminal to realign the timing of its main multipath component before the situation has changed again and a new realignment is required. In the case of a fixed or low mobility system as discussed in Baines, the set of timing offsets transmitted as a list to a terminal remains valid for a relatively large amount, but are not sufficiently current for a high mobility system as will be better understood from the following.

4. Baines discloses a method in a base station whereby, for a received subscriber terminal signal, the base station detects the various multipath components comprising said signal (column 6, lines 55-56). The base station then transmits a message to the subscriber terminal, the message comprising a list of timing offsets together with a numerical identifier for each one, the timing offsets corresponding to respective ones of the multipath components comprising the received subscriber terminal signal (column 6, lines 56-59). Then, when the base station decides that the subscriber terminal needs to change its timing alignment, it transmits to the subscriber terminal the numerical identifier of the timing (offset) to which the terminal should jump (column 6, lines 60-63). Thus, Baines overcomes

problems associated with slewing whereby a stream of one bit commands are continuously transmitted to the subscriber terminal to either advance or retard its timing by a small amount. The continuous one bit command stream comprising slewing can cause jitter which is undesirable and, despite the fact that in Baines each jump command requires several bits as opposed to one, the overall control message overhead in Baines is less than encountered with slewing since considerably fewer jump commands are required that the number of one bit commands used in slewing (column 7, lines 2-8).

5. However, Baines is primarily directed at fixed wireless access solutions where subscriber terminals are fixed relative to the base stations, although it may also be applied to low mobility communication systems as found in shopping malls, for example. In such situations, the multipath components comprising a terminal signal received at a base station vary only very slowly with time. The multipath components tend to be relatively static to the degree that the only change in the composition of the components is the fading/growing of the components relative to each other, whereby, over a relatively long period, one of the components grows in magnitude to become the "main" component. When this occurs, the base station transmits to the subscriber terminal the numerical identifier of the timing to which the terminal should jump. This process can be repeated many times over a long time period before the base station determines that the list of timing offsets and their respective numerical identifiers for a terminal is no longer current. Therefore, it can be seen that, in a fixed or low mobility system such as discussed by Baines, infrequent jump commands are required to ensure that the main component of a received terminal signal is generally aligned with the main signal components transmitted by other terminals. Therefore, despite the fact that the initial message sent to a terminal from the base station comprising the list of timing offsets together with their respective numerical identifiers and the subsequent jump commands comprising selected ones of the numerical identifiers individually require much greater control message overhead than the individual one bit commands

encountered in slewing, the system of Baines requires much less *overall* control message overhead. This is due in part to the fact that the system of Baines requires the use of infrequent jump commands and in part to the fact that, since the mulipath components change only slowly with time, the list of timing offsets sent to each terminal remains valid for a very long period before being replaced by a more current list. It can be seen therefore that, in order for Baines to maintain a low overall control message overhead, it is a quality of the system that the multipath components of received terminal signals change only slowly, relatively speaking.

6. If the method of Baines were applied to a highly mobile environment such as discussed in the present application where the multipath components comprising a received terminal signal are rapidly changing and even disappearing/reappearing just as suddenly, the lists of timing offsets and their respective numerical identifiers sent to terminals would not remain current for any meaningful length of time. Consequently, it would be necessary to replace these lists very frequently resulting in a considerable increase of control message overhead which is undesirable.

7. It is apparent from the foregoing that Baines does not disclose the limitation of new claim 1 whereby each time the base station determines a best signal component from the multipath components comprising a received signal from a subscriber terminal, it determines a time difference between the newly determined best signal component and a reference time and then transmits a timing offset to said terminal to cause said terminal to adjusts its transmission timing such that the newly determined best signal component is received at the base station substantially in line with the reference time. In the case of Baines, an initial step is to detect the multipath components comprising a received terminal signal and to assign to each component a numerical identifier associated with a timing offset for that component. This list is transmitted to the terminal such that on subsequent occasions the base station need only send a numerical identifier to the terminal to cause signal timing realignment. However, the list transmitted to the terminal effectively comprises "old"

data which does not take into account possible temporal drifting of the signals components relative to each other. While this reduces the accuracy of alignment of signals in the system of Baines, the slowly changing nature of the system means that such changes do not over duly undermine the integrity of the system. This would not be the case in a high mobility environment. Consequently, the present invention differs from the system of Baines in making use of current data for determining a timing offset to be transmitted to a terminal.

8. In view of the foregoing, it is respectfully submitted that new claim 1 not only defines an invention that is novel over Baines but which is not rendered obvious thereby.

9. Independent claims 9, 18 and 19 have been amended to be consistent with amended claim 1 and are therefore believed to be in an allowable form for the reasons as discussed in sections 1 to 8 of this response.

10. Dependent claims 2 to 8, 10 to 13 and 20 contain all the limitations of their respective independent claims and are thus also believed to be in an allowable form.

11. The Examiner has rejected claims 14 to 17 under 35 U.S.C. 103(a) as being unpatentable over Toskala et al (US2002/0093940) in view of Posti (US6002919).. The Examiner will be aware that in *ex parte* examination of patent applications, the Patent and Trademark Office bears the burden of establishing a *prima facie* case of obviousness. MPEP § 2142; *In re Fritch*, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent and Trademark Office. MPEP § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984). Only when a *prima facie* case of obviousness is established does the burden shift to the applicant to produce evidence of nonobviousness. MPEP § 2142; *In re*

Oetiker, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). If the Patent and Trademark Office does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of a patent. *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985). A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. *In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993). To establish a *prima facie* case of obviousness, three basic criteria must be met. (1) First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. (2) Second, there must be a reasonable expectation of success. (3) Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. MPEP § 2142.

12. Toskala employs a Medium Access Control (MAC) Layer 2 series of time alignment bits (TABs). Toskala does not encounter the problem of needing to rapidly transmit a timing offset command in Layer 1 in response to determination of a new best signal component since it employs a continuously transmitted stream of TABs to effect uplink timing adjustment. In view of this, there would be no motivation for a skilled person to interfere with the system of Toskala since it presents no problem that usefully needs solved and since no useful benefit would arise from the proposed modification suggested by the Examiner.

13. In view of the above, it is respectfully submitted that claim 14 is not rendered obvious by the combination of Toskala and Posti and is in an allowable form.

14. Independent claim 16 is a device counterpart to method claim 14 and so is believed to also be in an allowable form for the reasons as set forth in section 12 of this response.

15. In view of the fact that all the Examiner's comments have been addressed, further and favourable consideration is respectfully requested.

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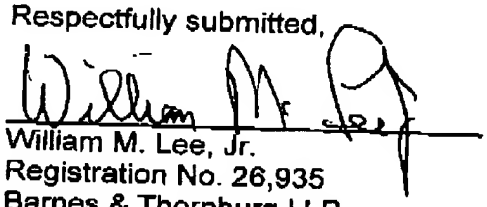
Respectfully submitted,



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